



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,653	04/14/2004	Kwang-ki Choi	030681-649	4964

21839 7590 04/06/2006

BUCHANAN INGERSOLL PC
(INCLUDING BURNS, DOANE, SWECKER & MATHIS)
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER

LANE, JEFFREY D

ART UNIT	PAPER NUMBER
----------	--------------

2828

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/823,653	Applicant(s) CHOI ET AL.	
	Examiner Jeffrey D. Lane	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/14/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 1-4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Semi-Conductor Laser Device With A Mesa A Rounded Edge Mesa Structure.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 2828

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 are rejected under 35 U.S.C. 102(b) as being anticipated by Okazaki et al. (US 5,966,396).

As for claims 1-8 Okazaki discloses, A semiconductor laser device, which includes a multi-semiconductor material layered mesa structure having a laser resonance layer on a substrate 101 and cladding layers formed over 108 and below 104 the resonance layer 106, comprising: rounded corners (not labeled) connected to the substrate 101, in a lower portion of the mesa structure; a current injection ridge (under 0.5~3.3 μm) formed on an upper portion of the mesa structure and protruding from an upper surface of the mesa structure; and a passivation layer 110 formed on the mesa structure and having a contact hole (opening under 0.5~3.3 μm) exposing an upper surface of the current injection ridge.

As for claim 2, Okazaki discloses, the upper and the lower cladding layers are a p-GaN/AlGaIn (See Column 5 line 15) layer and an n-GaN/AlGaIn layer (See Column 5 line 12), respectively.

As for claim 3, Okazaki discloses the resonance layer includes: a lower wave guide 105 layer stacked on the lower cladding layer 104 and having a greater refractive index than the lower cladding layer 104; an active layer 106 stacked on the lower wave guide 105 layer that generates a laser beam; and an upper wave guide layer 107

Art Unit: 2828

stacked on the active layer 106. The guide, active, and clad layers of fig. 3 are the guide layers of fig. 1, as stated on Column 8 lines 25-7 and Column 8 line 66- Column 9 line 6.

As for claim 4, Okazaki discloses, the refractive indexes of the upper and the lower wave guide layers are less than the refractive index of the active layer (for a wave guide to work it must have a lower index of refraction than the medium it is guiding the light through) and the upper and lower wave guide layers are GaN based group III-V compound semiconductor layers (See fig. 1).

As for claim 5, Okazaki discloses, the active layer is a semiconductor layer made of a GaN based group III-V nitride compound expressed as $\text{In}_{0.1\text{ to }0.9}\text{Al}_{0.1\text{ to }0.9}\text{Ga}_{1-x-y}\text{N}$ where $0.1 \leq x \leq 0.9$, $0.1 \leq y \leq 0.9$, and $x+y \leq 1$. (See column 5 lines 19-20). According to the claim y can equal 0.

As for claim 6, Okazaki discloses, wherein the ridges are formed on the upper cladding layer 108, and a second compound semiconductor layer 109 is formed on the current injection ridge (under $0.5 \sim 3.3 \mu\text{m}$).

As for claim 7, Okazaki discloses, the second compound semiconductor layer 109 is a p-GaN based group III-V nitride semiconductor layer (109 fig. 1). . The guide, active, and clad layers of fig. 3 are the guide layers of fig. 1, as stated on Column 8 lines 25-7 and Column 8 line 66- Column 9 line 6.

As for claim 8, Okazaki discloses, the substrate further includes an n-type electrode 111 on the upper surface, and the substrate is a sapphire substrate having a gallium nitride (GaN) semiconductor material layer (see Column 5 lines 10-1).

3. Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Ruyven (US 4,476,563).

As for claims 1 and 9, Van Ruyven discloses in fig. 12, A semiconductor laser device, which includes a multi-semiconductor material layered mesa structure having a laser resonance layer 12 on a substrate 8 and cladding layers formed above 13 and below 11 the resonance layer, comprising: rounded corners (not labeled) connected to the substrate 8, in a lower portion of the mesa structure; a current injection ridge (under the top "ø" mark) and force distribution ridges (on the sides of the injection ridge) formed on an upper portion of the mesa structure and protruding from an upper surface of the mesa structure; and a passivation layer (not labeled) formed on the mesa structure and having a contact hole exposing an upper surface of the current injection ridge.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki et al. (US 5,966,396) in view of Witzigmann et al. (US 2004/0264529).

Okazaki discloses all that pertains to claims 1-8, as shown above. However Okazaki does not disclose force distribution ridges. Witzigmann discloses, "the plurality of pads protrude beyond an edge of the ridge structure. The laser chip can thus be held by a

Art Unit: 2828

manufacturing tool, such that the manufacturing tool abuts the pads without abutting the ridge structure." (Paragraph [0008]) Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use force distribution ridges with Okazaki's laser, so that the chip can be held without abutting the ridge structure.

6. Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okazaki et al. (US 5,966,396) in view of Tsukada et al. (US 4,142,160).

Okazaki discloses all that pertains to claims 1-8, as shown above. However Okazaki does not disclose force distribution ridges. Tsukada discloses, "However, when this laser structure is combined with a heat sink or means such as a combined heat sink and optical wave guide, a combination which is mechanically very stable can be obtained due to the fact that this embodiment includes the mesa portions in addition to the central stripe mesa on the crystal surface." (Column 7 lines 28-34) Therefore it would have been obvious to one of ordinary skill in the art to use force distribution ridges with Okazaki's laser to be mechanically stable.

Note

Yusa (US 6,348,108) does not disclose a light-exiting surface, as suggested by line 6 of page 4 of the specification of the instant application.

U.S. Patent

Oct. 12, 1999

Sheet 4 of 14

5,966,396

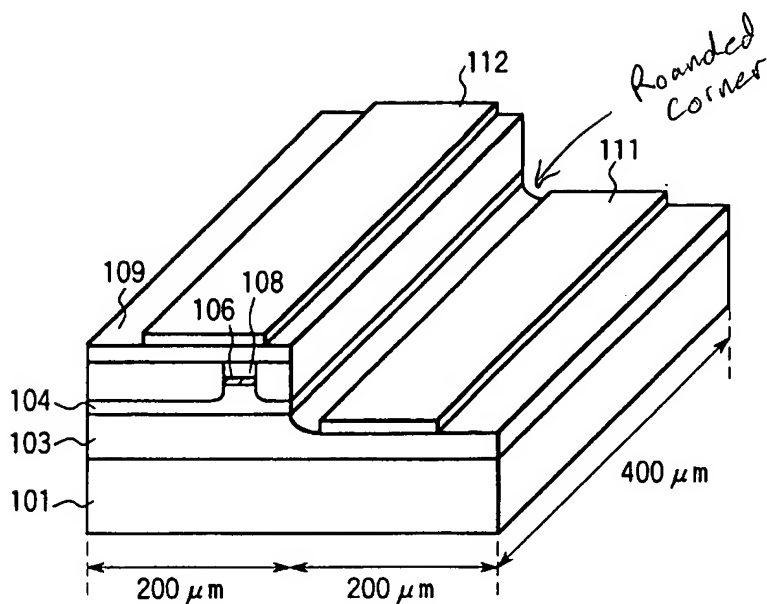


FIG. 4A

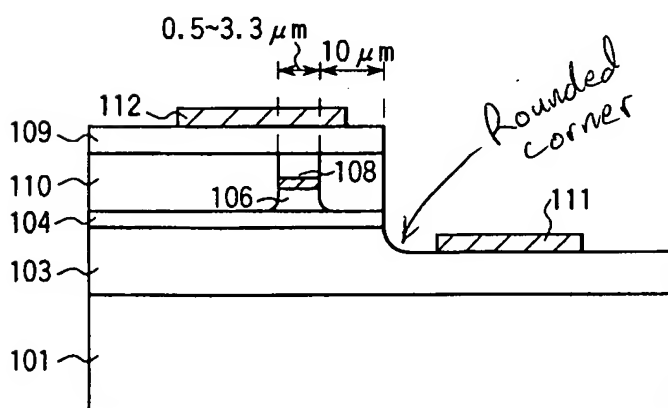


FIG. 4B


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey D. Lane whose telephone number is (571) 272-1676. The examiner can normally be reached on Monday thru Friday 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jeffrey D. Lane
Examiner
Art Unit 2828

JDL


Art Unit 2828